STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
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September 14, 2000

Phillip G. Loscoe, Director
Office of Spent Nuclear Fuels
U.S. Department of Energy
P.O. Box 550, MSIN: S7-41
Richland, Washington 99352

Dear Mr. Loscoe:

Re: Response to "Transmittal of Final Laboratory Data Reports for Toxicity Characteristic Leaching Procedure (TCLP) Analyses Performed on K-East (KE) Basin Sludge Samples," letter from P.G. Loscoe to Joan K. Bartz and Larry E. Gadbois, dated August 8, 2000

The Washington State Department of Ecology (Ecology) and the U.S. Environmental Protection Agency (EPA) have reviewed the subject data reports prepared by the 222-S Laboratory (Fluor Hanford, Inc.) and by the 327/325 Laboratories (Pacific Northwest National Laboratory) for the U.S. Department of Energy (USDOE). Ecology and EPA concur that the data are acceptable for use and that the data demonstrate that the K-East Basin sludges do not designate as Toxic for metals.

Ecology, EPA, and USDOE and its contractors have worked together since November 1999 to ensure that the sampling and analysis of these sludges would be acceptable and the approach to data interpretation would be understood by all parties. The following reiterates the agreements made during our meetings. (The quotes are from the subject letter with some further information which we believe is important to document.)

(1) "The method in which sludge samples had been collected from the basin, including composites, was sufficient to ensure representative samples were available for analyses."

(2) "The sample size for TCLP, although smaller than typically analyzed in a non-radioactive environment, was sufficient given the methodology for running duplicates and splits." Ecology requested a target test portion of 10 grams minimum and replicate extractions so that the precision of the extraction and nature of the sample material could be evaluated. Ecology also requested analysis of total metals for comparison to the data from the extraction so that the consistency and reasonableness of the data could be established. See item (4) for further use of the total metals data.

(3) "TCLP analysis for organic constituents was not necessary, based on process knowledge of the waste. Only the heavy metals of concern would be analyzed." Although polychlorinated biphenyls are known constituents of the sludges, Ecology agreed to eliminate analysis of the organics on the Toxicity Characteristic list. In addition, Ecology agreed to omit mercury from the determination.

(4) "Both the KE and K-West (KW) Basins contain SNF (*Spent Nuclear Fuel*) from N Basins. The accumulated sludge in the KE and KW Basins would be considered sufficiently similar that TCLP data from the KE Basin (*sludge*) could be used to calculate the TCLP concentration in the KW Basin (*sludge*) by direct comparison to the total metals data in each basin. This would eliminate the need to run separate TCLP analyses of the sludge from the KW Basin." (*Italicized words in parentheses are added for clarity.*) Ecology agrees that this is a reasonable basis for making a waste designation for the K-West Basin sludges, based upon process knowledge.

(5) "Holding times for the KE Basin samples could exceed the standard times for TCLP analysis, since only metals were being analyzed and metals would not be affected by longer holding times." Ecology had no concerns about biological activity or chemical volatility affecting the samples. Ecology did ask that the holding times for the prepared extractions and digestates be enforced.

(6) The revised Data Quality Objectives document and the Sampling and Analysis Plan were provided to Ecology and EPA for review and comment. All issues were satisfactorily addressed before the analytical work was performed.

Ecology and EPA evaluated the results of the analyses to ensure that the numerical results support the conclusion that the results for TCLP extractable metals are below the threshold for regulation as dangerous waste. The referenced transmittal letter states that "heavy metal concentrations are far below the threshold for regulation as dangerous waste..." This is generally true, with the exception of cadmium results from the 222-S Laboratory which were 65 percent of the Toxicity Characteristic limit, and selenium results from the Pacific Northwest National Laboratory which were as high as 50 percent of the Toxicity Characteristic limit. The quality control data for these analyses were notably good, thus supporting the conclusion that cadmium and selenium are below the threshold for regulation. The final results for all other analytes support the conclusion that Toxic metal concentrations are far below the threshold for regulation.

Ecology and EPA note that an error was made in the test portion to extraction solution ratio in the 222-S Laboratory (1:14 was used instead of 1:20), but agree that the resulting data still may be used for waste designation of these sludges.

Ecology and EPA also reviewed the supporting quality control data. A number of quality control deficiencies were noted. The more significant deficiencies are listed below:

- Spike recoveries for silver and selenium and barium recovery in the soil standard at the 222-S Laboratory were slightly outside target results. However, the sample results for these three analytes were well below the Toxicity Characteristic limits.
- The chromium in the soil standard at the 222-S Laboratory deviated substantially from the prediction interval; however, sludge sample results for chromium were very low relative to the Toxicity Characteristic limits.

- Matrix spike recoveries for silver in several of the 327/325 Laboratory quality control samples were outside target ranges. However, silver results in sludge samples were very low relative to Toxicity Characteristic limits. In addition, this situation is commonly observed for the TCLP extraction/digestion procedures and is an inherent problem in the procedure.

- Relative percent differences between a sample and its duplicate for silver, barium, cadmium, chromium, and lead exceeded "acceptance" limits of 20 percent. These analytes all had low concentrations in sludge samples relative to the Toxicity Characteristic limits. More importantly, these data are related to the nature of the sample material and do not relate to the acceptability of the analytical data for use in waste designation.

Although these quality control issues introduce additional uncertainty in some of the results, the analytes with increased uncertainty are those with low concentration relative to the Toxicity Characteristic limits. Therefore, Ecology and EPA agree that these data support the conclusion that, based on Toxic metal concentrations, the sludges are below the threshold for regulation as dangerous waste.

If you have any questions regarding this letter, please contact Greta Davis, T Plant Permit Writer for Ecology, at 376-3025 or Larry Gadbois with EPA at 376-9884.

Sincerely,

Joan K. Bartz
Nuclear Waste Program Chemist
Department of Ecology

Sincerely,

Larry Gadbois,
K Basins Project Manager
U.S. Environmental Protection Agency

JKB:LG:lkd

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